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WAR MEDICINE AND SURGERY

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DISEASES OF THE SKIN IN WARTIME.

Diseases of the skin are of minor importance as far as danger to life is concerned, but they cause great wastage of manpower and medical equipment in both economic and military spheres. The dermatoses that are common on the home front are rather different from those that predominate amongst the fighting forces, and there is a further variation in each case according to climate and locality. All these factors make it impossible to state dogmatically what are the commonest affections of the skin at the present time. One English writer in 1940 stated that scabies and pyodermia were the most prevalent skin diseases in this war, as in the last.[1] More recent English literature confirms the importance of these two conditions and also lays stress on pediculosis, which occurs commonly, causes inconvenience, and predisposes the sufferer to typhus, trench fever and relapsing fever. Numerous references are also made in both British and American journals to the increased importance of industrial dermatitis.

Some Australian figures are now available, showing the incidence of diseases of the skin amongst soldiers in the Northern Territory. It was found that soldiers with these disorders comprised 20% to 60% of the total patients admitted to the military hospitals, so that dermatology is important in wartime. The nine most common skin conditions found were: (*a*) sweat rashes; (*b*) septic sores; (*c*) tinea; (*d*) furunculosis; (*e*) *acne vulgaris*; (*f*) dermatitis of external irritant origin; (*g*) eczema of endogenous type; (*h*) hyperkeratosis and *carcinoma cutis*; and (*i*) light sensitivity. Because of the local interest in these diseases we shall discuss them before those which preponderate overseas; the latter, however, may at any time become important in Australia.

Sweat Rash.

Sweat rash is extremely common in the Northern Territory, as in other places subject to a hot climate. It occurs mostly on areas of skin where the evaporation of sweat is restricted; for example, in the axilla and the genito-crural region. It may also appear on other areas such as the forearms, if sweating is profuse. The rash is likely to be converted into an acute dermatitis by the use of antiseptic soap and is also liable to pyogenic infection.

Prophylaxis consists mainly in drying the sweat as it forms, and in regular washing. A bath should be taken twice a day when water is available and military conditions permit. Soap should be used for the bath taken at the end of the day's work, and should be of a non-medicated type. A body powder consisting of talcum containing not more than 5% boric acid should be used freely.

When a sweat rash has developed it may be treated by means of a heavy calamine lotion containing an antipruritic such as 1% carbolic acid.

Septic Sores.

Nomenclature.

Septic sores have been described for many years as "barcoo rot" in Northern and Central Australia and as "veldt sore" in Africa. The same condition has also been termed "desert sore" by medical officers in the Middle East in the present war. It is due to a pyogenic infection, so that the true tropical ulcer, which results, probably, from spirochætes, is a different disease, though the term tropical ulcer is sometimes loosely used. Diphtheritic skin infections which occurred occasionally in the Middle East are also better excluded from the classification of septic sore, because of the differences in ætiology, course and treatment. Septic sores sometimes ulcerate and these ulcers are probably identical with those recently described by an Australian dermatologist under the name *pyoderma ulcerosum tropicalum*.[2]

Incidence and Ætiology.

Septic sores are very common in the Northern Territory and were also one of the chief medical problems in the Western Desert campaign in Africa. Pathogenic hæmolytic streptococci can be isolated from practically all of these sores in the early stages of the lesion, but frequently there are associated organisms such as *Staphylococcus aureus*. These other organisms are not regarded as important in the ætiology, for their presence does not hinder healing, if the streptococci are eliminated. There are certain factors predisposing to the development of septic sores: (*a*) Lack of proper facilities for washing. It was noticed in the Middle East that an outbreak would occur amongst troops who were on extended exercises and had no opportunity for bathing, whereas troops permanently stationed in the same area and having ample washing facilities remained free. Moreover, the sores were most common in the hot summer weather when cleanliness was more difficult to maintain. (*b*) Trauma. The sores always occur on exposed surfaces such as the legs, arms and hands; in other words, on the surfaces liable to suffer trauma. The lesion from which a septic sore develops may be only a minor one such as the bite of an insect, a small cut, a scratch or an abrasion. (*c*) Vitamin deficiency. There has been a long-standing belief in the importance of vitamin deficiency as a predisposing factor in septic sores. This has been disproved in regard to vitamin *C*, but it is possible that it may be true of other dietary deficiencies.

Type of Lesion.

The lesion commences as one or more vesicles which soon break and form a shallow ulcer. These are generally covered with crusts and surrounded by an area of cellulitis, which is painful in the early stages. Next the ulcer becomes indolent, fluctuating between partial resolution and extension, and continuously exuding pus. It usually ceases to be painful. In the type described as *pyoderma ulcerosum tropicalum* the initial lesion extends and deepens beneath the crust, which eventually breaks to reveal a deep ulcer, one to several inches in diameter.

Prophylaxis.

Regular baths and change of clothes are desirable in order to maintain cleanliness. Minor injuries to the skin surface cannot be avoided, but they should be treated promptly by the application of a protective dressing. When the climate permits, long trousers and long-sleeved shirts should be worn. A rigidly controlled technique is necessary to prevent the transmission of infection by those who dress the septic sores. Forceps should be used so that the infected area is not touched by the dresser's hands, and

masks should be worn by anyone present at the dressing of the wound. Successful treatment of the patients with established sores is an important prophylactic measure, since the greater the number of patients with infected sores, the greater the risk of infection to others.

Treatment.

The patients must be kept at rest during treatment and given a generous diet. Each day any crust or discharge covering the lesion should be removed and local treatment given. There is no local application yet known which can be relied on to induce healing in all cases. To give a list of those that have been tried would be to name most of the antiseptics that have ever caught the fancy of a medical officer. Ammoniated mercury ointment probably earned the best reputation in the last war; of the newer drugs, sulphonamide powder, properly used, has had moderate success, and the newer acridines, though promising, still wait adequate trial.

Tinea.

Tinea infections are common; among the soldiers in the Northern Territory they make up about one-third of the skin diseases requiring therapy. Three applications are usually available for treatment: (i) Whitfield's ointment. This should contain a full 3% of salicylic acid and 5% of benzoic acid if the best results are to be obtained. (ii) "Mycozol." This is a paint containing 2% of salicylic acid, 2% of benzoic acid, 0·1% malachite green and 5% of chloretone. (iii) *Tinctura Iodi Mitis* with 5% of salicylic acid added. This is satisfactory for those patients whose skins will tolerate iodine. These three applications, together with an antiseptic foot powder for prophylactic use, provide for the treatment of the average patient with tinea. When the infection involves the feet or hands, however, it is liable to be recurrent and the patient may have to be evacuated to a well-equipped base hospital.

The above three preparations cannot be used when the condition is acute. During this stage the patient should be rested and treated with wet dressings of a mild antiseptic such as boric acid.

Unless socks and shoes are sterilized, reinfection of the patient is likely to occur.

Acne Vulgaris.

The mild forms of *acne vulgaris* do not constitute a disability, but there is a severe type in which there are deep pustular lesions on the back. When the disease is intractable, the pus should be expressed from the follicles and the affected area painted with *Tinctura Iodi Mitis* or a solution of an acridine compound.

Other Skin Diseases Prevalent in the Northern Territory.

Furunculosis is rather common and is treated by the usual methods. Dermatitis of external irritant origin is liable to follow a sweat rash, but is otherwise uncommon. Patients with eczema of the endogenous type, hyperkeratosis, carcinoma of the skin, solar sensitivity or plantar warts frequently cannot be treated with the limited facilities available in the northern area and have to be evacuated south.

Scabies.

From the end of the Great War until about 1936 scabies was becoming more and more rare in England. Since 1936, for reasons as yet unknown, it has been steadily increasing, and since the beginning of the present war it has again become very prevalent.

Symptoms and Signs.

After an incubation period of about ten days the patient becomes conscious of itching which is usually worse in the early part of the night. There is, however, a wide individual variation in tolerance to the itch of scabies. A few people feel the sensation only when the external temperature changes, and, while undressing, they indulge in what has been called "a contemplative scratch". The itch is apparently due to sensitization of the body towards products from the parasite.

The characteristic lesion of scabies is the burrow. This is from about three to ten centimetres long, curved in shape and slightly projecting. When the patient is of clean habits the burrow may be white and difficult to see, but in others it shows as a greyish black line owing to the presence of dirt. Burrows are most likely to be found between the fingers and on the palm, the anterior surface and ulnar edge of the wrist, the ulnar border of the hand, the elbow, the anterior fold of the axilla, the penis and the lower part of the buttock.

Other lesions are in the form of vesicles or indurated papules. In addition, scratch marks are often visible, and secondary pyogenic infection is commonly present.

Diagnosis.

Sequeira is reported to have said that the practitioner who could infallibly diagnose scabies was an accomplished dermatologist. In many cases the clinical diagnosis is made obvious, however, by the following: (*a*) presence of itching, usually worse at night; (*b*) history of a similar affection in other members of the family; (*c*) involvement of hands, anterior axillary fold and penis; (*d*) comparative freedom of back and chest and absence of lesions from face and neck; (*e*) finding of a burrow.

The diagnosis is made certain by an examination under the microscope of the contents of a burrow. A drop of *Liquor Potassæ* is placed over the burrow and a scraping is taken with a scalpel. Some ova or an acarus may then be detected by microscopic examination of the scraping. This method is much easier than that of removing the parasite on the point of a needle.

Transmission.

It was formerly believed that scabies was very likely to be transmitted when an infected person shared clothing, bedding or towels with someone else. Recent experiments carried out on volunteers, however, show that this method of spread is uncommon. Direct contact appears to be the method by which the vast majority of sufferers are infected. A common sequence observed in England is that a soldier on leave contracts scabies from his wife, who in turn has caught it from the children; the latter communicate it to one another during play.

It is also possible that transmission can occur through contact with animals. Buxton has stated: "The disease is an occupational one amongst those whose pleasure or profession it is to breed dogs, nurse cats, milk cows, groom horses, tame lions, box with kangaroos or tend llamas."

Treatment.

Choice of Methods Available.—Many methods have been used in the treatment of scabies, but some are ineffective and others only moderately efficient. There are at least two difficulties in assessing the value of any given treatment: (*a*) The diagnosis may be wrong. Whenever scabies is prevalent, any irritating skin condition is likely to be confused with it. The diagnosis is sometimes difficult and can never be certain unless the mite can be demonstrated or, at least, an unmistakable burrow seen. (*b*) Even when the diagnosis is certain the assessment of cure may be unreliable. Many treated patients have extensive secondary impetigo or eczema, and if this is interpreted as persistent scabies the treatment that has been used may be condemned, and undue credit may be given to an impotent drug that is subsequently applied. It is even more unreliable to assume that a patient has been cured because symptoms such as irritation have disappeared.

These difficulties may be overcome if diagnosis is based on the finding of live female mites, and cure is assumed only if (*a*) the mites recovered from the skin are all dead and (*b*) a follow-up shows that relapse does not occur. If even one live mite is left, a recurrence of the disease is likely, though it may take several weeks to develop.

Using these methods, a group of workers has recently investigated the following substances used for the treatment of scabies:[11] Sulphur ointment as prescribed in

the British Pharmacopœia, Marcussen's ointment, flowers of sulphur, thiosulphate used with hydrochloric acid, sulphur lather tablets ("Sulfomil"), sulphur for internal use, derris root lotion, 2% rotenone emulsion ("Sarevan"), benzyl benzoate in the form of a solution, lotion or emulsion, dimethyl-diphenylene-disulphide ("Mitigal") and pyrethrum. The tests therefore covered most of the treatments in common use and only two, namely, sulphur ointment and benzyl benzoate, proved satisfactory. Of these the former alone can be applied thoroughly by the patient himself, for areas are likely to be left uncovered if the patient attempts to use either a lotion or a cream. Therefore, if it is not possible to get someone to apply the remedy to the patient, sulphur ointment should be prescribed; in all other cases benzyl benzoate may be used, and is generally considered to have certain advantages.

Preliminary Hot Bath.—It is commonly believed that a hot bath, followed by vigorous scrubbing, is an essential part of any treatment for scabies, and that scrubbing of itself often cures the disease. If efficient drugs are used, however, a cure can be effected without any bath at all; moreover, unless the scrubbing is severe enough to draw blood, it is unlikely to remove many of the mites. The bath may, however, enable the drug to penetrate the skin more readily and should be used whenever it is available.

Treatment with Benzyl Benzoate.—The patient spends ten minutes in a hot bath, soaping himself freely with the aid of a rough flannel, but not using a scrubbing brush. He then dries himself thoroughly. The benzyl benzoate emulsion is best applied by a trained attendant using an ordinary flat paint brush about an inch and a half wide. It is necessary to cover the whole body below the level of the neck and not merely those parts which appear to be affected. The application is allowed to dry and the patient then puts on clean underclothing. Two such treatments should be given either on successive days or at an interval of less than eight days. Those in close contact with the patient should be treated with him; otherwise he may be reinfected by them, for a patient does not acquire an immunity to scabies. Children may be safely permitted to return to school after they have been given one treatment.

Benzyl benzoate kills mites away from the body within five minutes. In this respect it contrasts with sulphur ointment which has no effect on the parasite in similar circumstances.

There are various preparations of benzyl benzoate that can be used in treating scabies. In the Australian War Pharmacopœia a *Lotio Benzylis Benzoatis* is included; its composition is:

Benzyl benzoate	25 parts
Triethanolamine	1 part
Stearic acid	5 parts
Water	to 100 parts

The weak base triethanolamine reacts with the fatty acid and the resulting compound acts like soap in helping to form an emulsion. The preparation is therefore an oil-in-water emulsion containing 25% of benzyl benzoate.

The original emulsion made up with soft soap and spirit has been superseded because of shortage of the raw materials required, but two other formulæ are in general use in England:[11]

Benzyl benzoate	20 to 25 parts
Lanette wax	1 part.
Water	to 100 parts

and the following:

Benzyl benzoate	20 to 25 parts
1% solution of "Cellofas"	to 100 parts

All the effective sarcopticides are skin irritants; benzyl benzoate frequently causes a burning sensation when first applied, and a dermatitis may subsequently develop, though not so frequently as when sulphur is used.

Disinfestation of Fomites.—In the past the disinfestation of clothes, bedding and towels has been regarded as essential in the proper treatment of scabies. As already indicated, however, the importance of these articles in the dissemination of scabies has been greatly overestimated. When a patient has been properly treated by benzyl benzoate emulsion or sulphur ointment, disinfestation of the clothing as a routine is unnecessary, since the layer of medicament which covers the body is usually sufficient to kill all the mites on the clothing. Moreover, in view of the small percentage of patients who become reinfected from clothes and bedding, it is simpler to repeat the treatment in such cases rather than to carry out routine disinfestation, which is expensive in both manpower and materials.[9] Emphasis should rather be laid on the follow-up and the routine treatmtent of close contacts, including the other members of the family and, in the case of children, the playmates. It is to be understood, of course, that disinfestation may be justified at times, as, for instance, when there is a high incidence of scabies among people living in overcrowded conditions and compelled to use communal bedding and clothing. The parasites are killed rather easily by heat, and ironing with an ordinary hot iron is quite effective for clothing or blankets.

Treatment with Sulphur Ointment.—The preparation used is the standard 10% ointment, or this ointment diluted to half-strength. On the first evening the patient takes a warm bath and scrubs open the burrows. Sulphur ointment is then rubbed into the whole skin surface below the neck, about two ounces being necessary to cover an adult. The inunction with sulphur is repeated on the second and third nights. On the fourth morning the treatment is completed by taking a second bath and putting on fresh clothing. If these details are observed, cure is certain, and the treatment should not be continued beyond three days. Slight itching may develop about four days after the last inunction, but this must be recognized as a slight sulphur dermatitis which will be aggravated by the use of more sulphur ointment. Blonde patients are especially liable to show hypersensitivity to sulphur and they should be treated with the 5% ointment.

Sulphur ointment is the best preparation for use by the patient himself, because, even if it is rubbed on carelessly, there is a chance that during the day it will be smeared out beyond the part to which it was applied. It has the disadvantage of being messy, but this can be overcome by using a vanishing cream base. "Mitigal", a proprietary organic sulphur preparation, is effective and pleasant to use, but is expensive and, at present, difficult to obtain. Marcussen's polysulphide ointment is effective, but even more messy than the sulphur ointment. The following preparations are ineffective: flowers of sulphur, sodium thiosulphate with hydrochloric acid, sulphur lather tablets, and sulphur taken internally.

Other Forms of Treatment.—Rotenone, the active principle of derris root, is still used, but effective concentrations are very irritating. An intractable scrotal dermatitis is likely to develop following its use. A new and promising, but relatively untried, method is the use of tetraethylthiuram monosulphide (T.E.T.M.S.). It is worthy of extended trial.[3]

Treatment of Scabies Complicated by Impetigo.—The complication of scabies by impetigo was very common during the Great War, sometimes occurring in 90% of the patients. In the majority of cases it is best to treat the scabies first. An antipruritic is added to the ointment used in treating the impetigo to allay the irritation produced by the treatment of the scabies.

Control of Scabies.

Mellanby has stated that:[10] "The only way in which scabies can be controlled is by ensuring that it is diagnosed as early as possible and every case is rapidly and successfully treated. It is probably always advisable to treat every member of the household even if many of the individuals show no symptoms, for . . . these may take several weeks to develop. . . . At present the most important step in the right direction would be one that ensured that medical officers, school nurses, and others concerned with problems of public health were able to recognize the condition, particularly in its early stages."

In many cities of Britain scabies in 1941 affected 2% to 4% of the population.[9] A "Scabies Order" has been brought in under Defence Regulations giving medical

officers of health power to require a person to attend for examination. Penalties can be enforced if treatment is refused.

The increased incidence of scabies has been ascribed to the herding of large numbers of the population in army barracks and in air-raid shelters. This is probably not true, because, as indicated previously, the number of patients with scabies began to increase before the war. The disease possibly has a periodicity based on the following factor: scabies became rare after the Great War, presumably because an efficient routine of diagnosis and treatment had been developed; and this very rarity was probably the cause of the subsequent increase, for (*a*) younger doctors were unfamiliar with the disease and the condition of patients was undiagnosed for longer periods and (*b*) patients who have never had scabies previously are not sensitized and do not develop symptoms for weeks or even months. There is thus increased opportunity for the spread of infection.

Pediculosis.

Pediculosis occurs in three forms—*pediculosis capitis*, *pediculosis corporis* and *pediculosis pubis*. During the Great War as many as 95% of the British troops who had seen six months' service in the line were found to be infected with pediculi. In civil life, too, the incidence is often high: at the present time there is a 30% to 50% incidence of head lice amongst young women of the industrial areas in Britain.[1]

Pediculosis Capitis.

The chief symptom of *Pediculosis capitis* is itchiness of the head. The scratching which results predisposes the patient to infection, and impetigo of the nuchal region is a common complication. In assessing the danger of *pediculosis capitis* it must be remembered that the head louse as well as the body louse can transmit typhus, trench fever and relapsing fever.

Paraffin, 2·5% solution of cresol, or methylated spirit has been used with moderate success in the past. Heliotropine, which is very efficient, but has the disadvantage of being inflammable, can be made up as follows:

Heliotropine	5 parts.
Castor oil	30 parts
Methylated spirit	65 parts

Three improved insecticides have recently been introduced for the treatment of *pediculosis capitis*:[2] (*a*) 25% technical lauryl thiocyanate in a white oil; (*b*) 50% "Lethane 384 special" in similar oil; and (*c*) derris cream containing 1% of rotenone. The dose is two to eight cubic centimetres a head, the larger dose being required for women. When these materials are applied the hair should be parted by one hand and the liquid or cream put on the scalp itself with a teaspoon or a pipette held in the other hand. This should be done on eight spots, four on each side; the material is then distributed by massaging with the fingers. It should not be distributed by combing, for that tends to draw the insecticide away from the scalp. The patient is instructed not to wash the hair for ten days, during which time the drug remains effective and reinfection is impossible.

Pediculosis Corporis.

Pediculosis corporis is most likely to occur in association with unclean clothes, especially when the same clothing has to be worn night and day. In such clothing the parasites enjoy the advantages of constant warmth and proximity to the human body, the blood of which supplies their food. Infected patients complain of irritation of the body, and scratch marks and pigmented macules are often seen. The lesions are not common on the elbows, buttocks or knees—regions which are generally affected in scabies. When the infestation is severe the lesions may be widespread, but they then tend to involve the back, which is usually left free in scabies. The diagnosis of *pediculosis corporis* should be confirmed by finding parasites or ova in the seams of the garments.

The main problem in the treatment of *pediculosis corporis* is the disinfestation of the clothing, for the pediculi are present on the skin only in severe forms of the disease and can be removed fairly readily by improvement in personal hygiene. It has been shown, however, that on occasions the lice may attach their eggs to the hair of the pubic, perineal or axillary regions. Therefore, in addition to repeated baths, the patient should be given a few inunctions of a mercurial ointment, sulphur ointment or heliotropine mixture, and possibly the body hair should be shaved off. Most attention should be given to the clothes and bedding, however. Dry heat at 54° C. kills both lice and nits. This heat can be obtained by various types of apparatus ranging from an iron or the oven of a kitchen stove to a "Thresh" disinfector which will deal with one hundred garments per chamber. In addition some measure of protection is given by dusting onto the clothes "N.C.I." powder which has the following composition:

Crude naphthalene	96 parts
Creosote	2 parts
Iodoform	2 parts

Since the outbreak of war some English workers have introduced a powder called "A.L.63" which is so fine that it clings to the clothes extraordinarily well, and which not only kills any lice present on the treated garment, but keeps it lice-free for about a week. Another insecticide in liquid form, used in small quantities, will render a shirt lice-proof for about a month.[4]

Pediculosis Pubis.

The crab louse causes an intense pruritus of the pubic area. The infection is often a venereal one, but an epidemic infestation may result from a community water closet or infected bedding. Treatment is simple: 2·5% carbolic lotion is effective and there is rarely any need to shave the pubic hair. The underclothing should be disinfected and the treatment should be repeated after a few days.

Occupational Dermatitis.

There are good reasons why occupational dermatitis should increase during wartime. Many employees in munition and engineering works are new to manual labour and their reaction to various industrial irritants is being tested for the first time. Again, in the case of the experienced employee there are a number of new chemicals to which he is exposed. Even in peace time diseases of the skin comprise some 70% of industrial disease, so that industrial dermatitis is an important subject. Much can be done prophylactically by the selection and training of personnel, the use of various barrier substances for protection and the maintenance of a clean skin. Occupational dermatitis is not disabling if the patient is removed from contact with the irritant.

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